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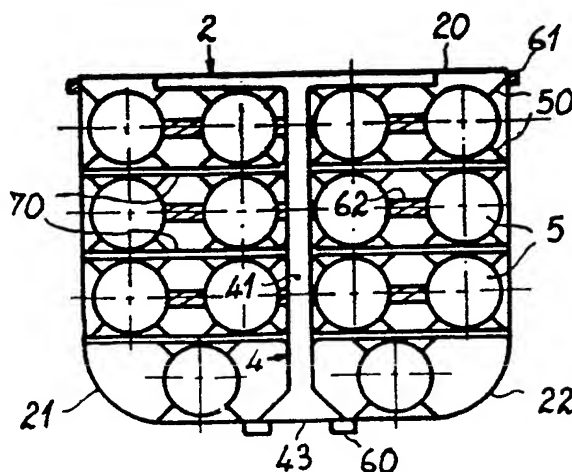
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(54) **Dispenser of subprojectiles**

(57) A dispenser (2) for stowing subprojectiles (5) in a main projectile has a substantially rectangular cross-section and comprises a support structure (4) with a cross-section in the form of a T. The subprojectiles (5) are disposed on either side of the vertical portion of the T structure (4), either longitudinally or transversely, and with partitions (70) either normal or oblique with respect to the vertical portion. The dispenser (2) further includes means (60, 61) eg. bolts with detonating cords, for release of side panels (21, 22) and means (62) eg. pyrotechnic pistons or inflatable bags, ensuring the ejection sideways of the subprojectiles (2), simultaneously or sequentially.

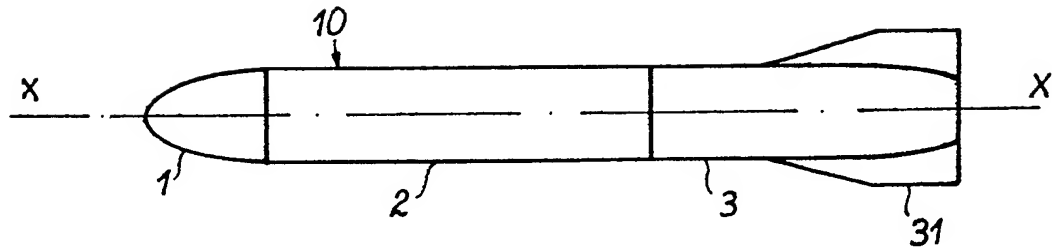
In a further embodiment (Figs. 4a, 4b), the subprojectiles are released downwards, simultaneously, by gravity. The dispenser (2) may be attached under an airplane.

FIG_2a

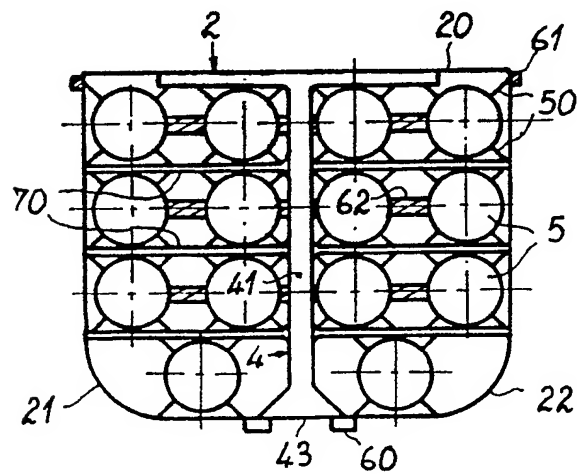


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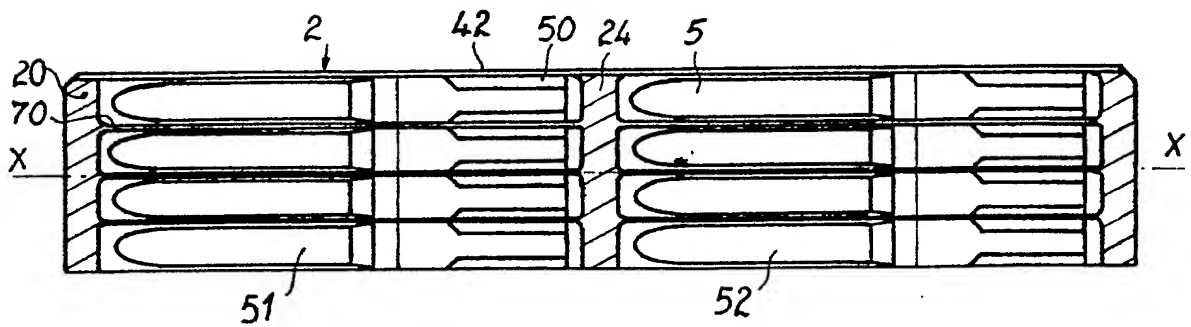
FIG_1



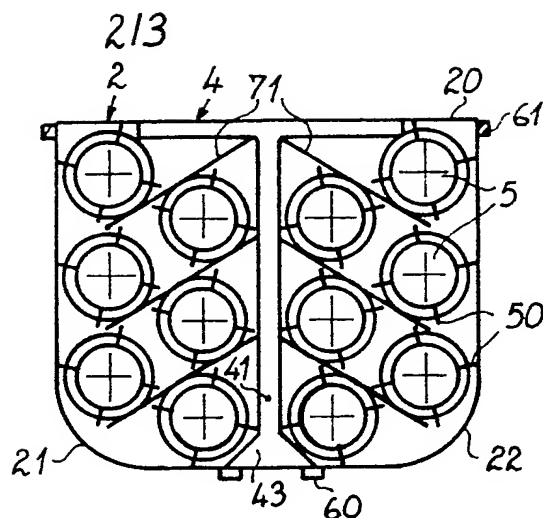
FIG_2a



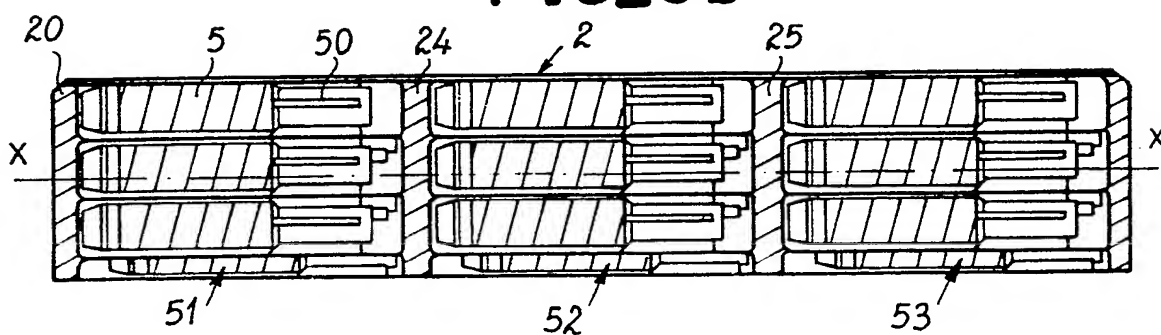
FIG_2b



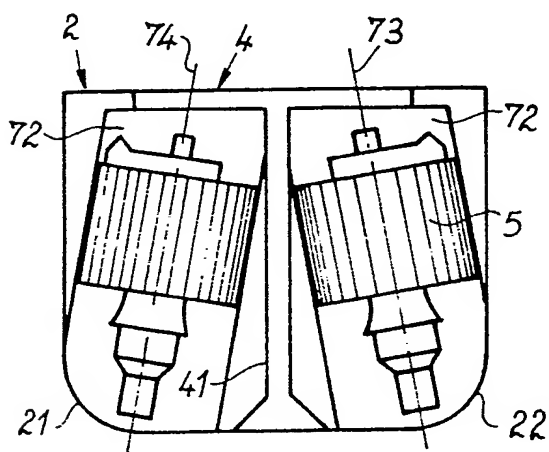
FIG_3a



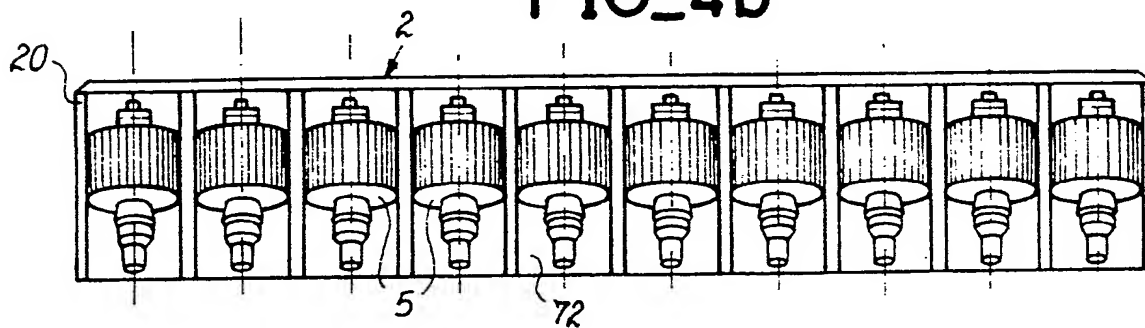
FIG_3b



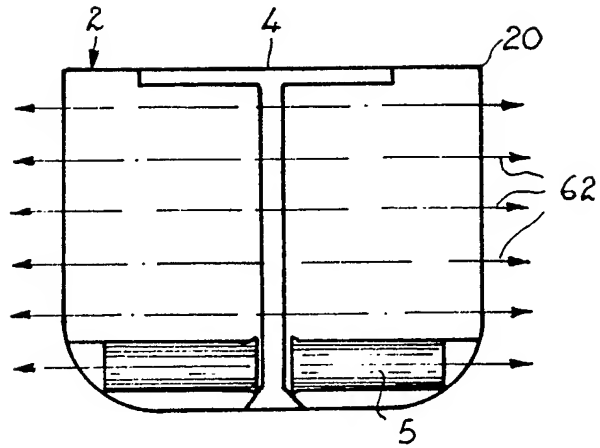
FIG_4a



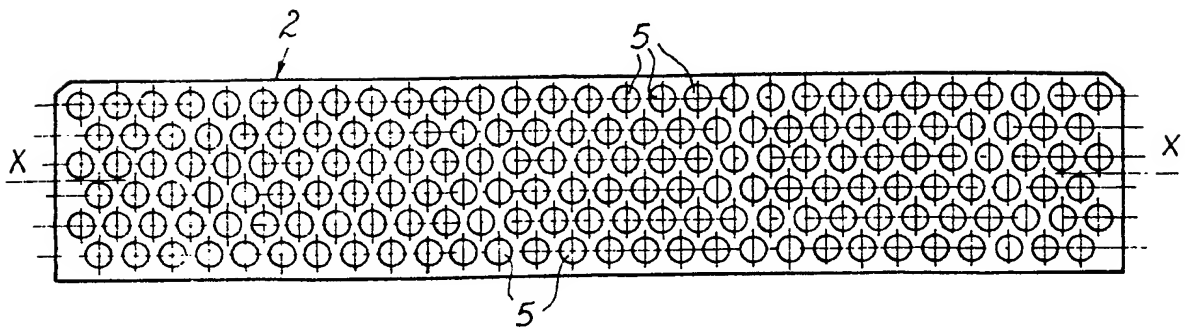
FIG_4b



FIG_5a



FIG_5b



Dispenser of subprojectiles

The present invention relates to a dispenser of subprojectiles.

- 5 Modern weapons systems often use the concept of vector, sometimes called "main projectile" or "main munition" carrying subprojectiles, often called "submunitions", to be distributed over extended surfaces or significant volumes.
- 10 A vector is generally made up of the following elements:
- a nose cone, generally streamlined, forming the fore part of the vector;
 - a dispenser containing the subprojectiles or submunitions;
 - 15 - an aft part provided with fins and possibly including an engine.

The vector is launched from the ground or from an airplane. At a given time, the subprojectiles are ejected towards the target zone.

- 20 In some applications, it is preferable or even necessary to eject the subprojectiles progressively along the trajectory of the vector. This results in several requirements to be met:
- the dispenser must remain rigid in spite of its opening for ejection of the subprojectiles;
 - 25 - in order for the trajectory of the vector to remain stable, the balance of the vector must not be disturbed by the ejection of one or more subprojectiles.

- In addition, the ejection of the subprojectiles, as regards the axis, the velocity and the ejection sequence, varies from one type of subprojectile to another. It is, therefore, desirable that the dispenser be adaptable and optimizable for each type of subprojectile.
- 30

An object of the present invention is a dispenser of subprojectiles meeting these requirements. To this end, it comprises an envelope having a substantially rectangular cross-section; a carrying structure
5 whose cross-section has the form of a T, the subprojectiles being disposed on either side of the vertical portion of the T, and means for the ejection of the subprojectiles by the side or by the bottom of the dispenser.

10 Other objects, features and advantages of the present invention will become apparent from the following detailed description given as a non-limitative example with reference to the accompanying drawings, in which:
- Figure 1 is a schematic view of various elements
15 usually making up a vector;
- Figures 2a and 2b, are sectional views, respectively cross and longitudinal, of a first embodiment of a dispenser according to the present invention;
- Figures 3a and 3b, are sectional views, respectively
20 cross and longitudinal, of a second embodiment of a dispenser according to the present invention;
- Figures 4a and 4b, are sectional views, respectively cross and longitudinal, of a third embodiment of a dispenser according to the present invention; and
25 - Figures 5a and 5b, are sectional views, respectively cross and longitudinal, of a fourth embodiment of a dispenser according to the present invention.

In these Figures, the same numerical references designate same elements.

30 Referring to Figure 1, it is then a schematic showing the various elements of a conventional vector.

The vector as a whole is designated by the reference 10. It has a longitudinal axis XX and comprises successively:

35 - a nose cone 1 forming the fore part of the vector

and whose shape is preferably streamlined, for example substantially conical;

- a dispenser 2, located near the nose cone and carrying the subprojectiles (not shown in Figure 1);
- 5 - an aft part 3 provided with fins 31. This aft part possibly includes an engine.

In addition, the vector 10 may be equipped with a guidance system (not shown in Figure 1).

10 Referring now to Figures 2a and 2b, they show a first embodiment of the dispenser according to the present invention, as seen in cross-sectional view and in longitudinal sectional view, respectively.

This vector is essentially made up of a carrying structure 4, substantially in the form of a T, and an
15 envelope 20 with a substantially rectangular cross-section.

The dispenser 2 carries subprojectiles 5 stowed here longitudinally as is appears more clearly in Figure 2b. The subprojectiles 5 are stowed on either side
20 of the vertical portion of the T-structure, for example in four superimposed layers and two successive stacks designated by the references 51 and 52. Each layer comprises one or more subprojectiles. The subprojectiles 5 are disposed between partitions 70
25 attached both transversally (Figure 2a) to the vertical portion 41 of the T-structure and substantially normal to this portion, and longitudinally (Figure 2b) to the ends of the envelope 20 and to a central partition 24. The subprojectiles 5 include, for example, each fin
30 system 50. The vertical portion 41 of the T-structure ends, for example, by a slightly widened foot 43.

The dispenser 2 further includes means for ejecting the subprojectiles 5. In this embodiment, the ejection means are bolts or hooks and detonating cords that

allow, on command, to eject the side portions 21 and 22 of the envelope 20. More precisely, each of the side panels 21 and 22 is attached to the foot 43 of the T-structure by bolts shown schematically at 60 and
5 to the upper portion of the envelope 20 by bolts shown schematically at 61. With these bolts are associated detonating cords that, on command, eject the bolts and hence the side panels.

The ejection means further include devices 62 disposed
10 between the subprojectiles of one and the same layer and between the vertical portion 41 of the T and the subprojectiles 5. These devices 62, such as pyro-technic pistons, inflatable bags or mechanical
15 ejectors, are attached to the T-structure or to a subprojectile and have the function of imparting, on command, a lateral velocity to the adjacent subprojectile in view of its ejection.

The operation of this device is, therefore, as follows:
At the time chosen for the ejection of the subpro-
20 jectiles, there is triggered the ejection of the side panels 21 and 22 through the bolts 60 and 61 and their detonating cord. If it is desired that all subprojectiles 5 be ejected substantially at the same time, there is then triggered substantially simultaneously
25 the operation of the devices 62. If it is desired that the subprojectiles 5 be ejected according to a predetermined sequence, the devices 62 are operated in the order corresponding to this sequence. For reasons of stability of the dispenser 2, it is pre-
30 ferable to trigger the ejection of the subprojectiles in a symmetrical manner.

This embodiment is more particularly suitable for subprojectiles having a rigidity and a mechanical strength sufficient for them not to be damaged by the
35 action of the ejection devices 62 or the aerodynamic

force to which they are submitted during their ejection.

Scattering of subprojectiles is here a function of the velocity of the carrier, of the ejection sequence and
5 of the lateral velocity of ejection of the subprojectiles.

Referring to Figures 3a and 3b, they show a second embodiment of the dispenser according to the present invention, as seen schematically in sectional view,
10 cross and longitudinal, respectively.

This embodiment is analogous to that of Figures 2, except for the disposition of the subprojectiles in the dispenser 2.

By way of example, the subprojectiles 5 are disposed
15 here in three vertical stacks designated by 51, 52 and 53. In each of the stacks, the subprojectiles are disposed between two partitions 71 or between a partition 71 and the envelope 20 of the dispenser. The partitions 71 are, as the partitions 70, attached
20 to the vertical portion 41 of the T-structure but here the partitions 71 are tilted downwards.

The operation of the device on ejection is the following:

As previously, the side panels 21 and 22 are ejected
25 through means such as bolts and detonating cords. When the side panels are ejected, the subprojectiles 5 are drawn downwards by gravity and devices such as 62 (Figure 2a) are here no longer necessary. The scattering of the subprojectiles is then related only
30 to the velocity of the vectors.

This embodiment is particularly suitable for subprojectiles exhibiting a certain longitudinal fragility and that ejection devices such the devices 62 of

Figure 2a might break.

Referring to Figures 4a and 4b, there is shown a third embodiment of the dispenser according to the present invention, as seen in sectional view, cross
5 and longitudinal, respectively.

This embodiment is also analogous to the preceding ones, except for the disposition of the subprojectiles
5.

In the present case, the subprojectiles 5 are stored
10 in compartments designated by the reference 72 and formed by partitions attached to the T-structure. The dispenser includes, for example, two compartments in the cross-section and ten compartments in the longitudinal direction. These compartments are disposed
15 so that on ejection, that takes place as in the preceding embodiments, the subprojectiles 5 are ejected downwards by gravity only, and this along the axes 73 and 74 that are not parallel to the vertical portion
41 of the T-structure and substantially divergent so
20 as to widen the cone of dispersion of the subprojectiles.

Such a disposition is, for example, suited to the ejection of subprojectiles whose descent is slowed down by a parachute.

Referring to Figures 5a and 5b, there is shown a
25 fourth embodiment of the dispenser according to the present invention, as seen in sectional view, cross and longitudinal, respectively.

This embodiment also differs from the preceding ones by the disposition of the subprojectiles 5.

30 In this embodiment, the subprojectiles 5 are disposed transversely, in a honeycomb structure (not shown).

In the ejection phase, as previously, the side panels

21 and 22 are first ejected, then the subprojectiles 5 are ejected laterally (arrows 62) by means of pyrotechnic pistons or of inflatable bags, simultaneously or sequentially.

- 5 Such an embodiment can be used for rigid subprojectiles, for example of the grenade type.

It thus becomes apparent that the structure of the dispenser according to the present invention permits it to remain rigid on opening of the side panels, and
10 stable, which makes possible a progressive ejection of the subprojectiles carried aboard. In addition, the T-shaped carrying structure makes possible the ejection both downwards and sideways, which offers an advantage from the point of view of safety when the
15 vector is attached under an airplane : in case of accidental triggering of the ejection of the subprojectiles, the risk of damage to the plane is reduced with respect to a vector with radial ejection.

Furthermore, this structure, being highly flexible,
20 allows to easily optimize the dispenser for each type of subprojectiles, whose diversity of calibers, shapes and conditions of ejection has been illustrated above.

Other advantages of this structure are the following:

- simple attachment of the ejection means;
- 25 - possibility of ejection with or without transverse velocity;
- simplification of the dimensioning calculations, that are limited to those of the T-structure;
- flexibility of use : the subprojectiles, when
30 installed, can easily be replaced by others.

Claims

1. A dispenser of subprojectiles, comprising:
 - an envelope with a longitudinal axis and a substantially rectangular cross-section;
 - 5 - a carrying structure with a section substantially in the form of a T;
 - means for stowing the subprojectiles on either side of the vertical portion of said T-structure; and
 - means for the ejection of said subprojectiles out
10 of said dispenser, sideways or downwards.
2. A dispenser according to claim 1, wherein said stowage means comprise partitions attached transversally to said vertical portion of said T-structure and, at their longitudinal ends, to said envelope,
15 said subprojectiles being disposed between said partitions and between said envelope and said partitions.
3. A dispenser according to claim 2, wherein said partitions are substantially normal to said vertical
20 portion of said T-structure.
4. A dispenser according to claim 2, wherein said partitions are oblique with respect to said vertical portion of said T-structure.
5. A dispenser according to claim 1, wherein said
25 stowage means includes compartments, said subprojectiles being disposed in these compartments so that, on their ejection, their trajectory forms a small or zero angle with said vertical portion of said T-structure.
- 30 6. A dispenser according to claim 1, wherein said subprojectiles are disposed longitudinally.
7. A dispenser according to claim 1, wherein said subprojectiles are disposed transversally.

8. A dispenser according to claim 1, wherein said envelope comprises side panels and wherein said ejecting means comprise means ensuring, on command, the ejection of said side panels.
- 5 9. A dispenser according to claim 1, wherein said ejecting means comprise means imparting, on command, a lateral velocity to each of said subprojectiles.
10. A dispenser of subprojectiles substantially as hereinbefore described with reference to Figures
- 10 2-5 of the accompanying drawings.

CLAIMS

1. A dispenser of subprojectiles, comprising:
 - an envelope with a longitudinal axis and a substantially rectangular cross-section;
 - a structure for supporting the subprojectiles with a section substantially in the form of a T which extends in the direction of the longitudinal axis;
 - means for stowing the subprojectiles on either side of the vertical portion of said T-structure, the cross piece of the T-structure being located above the vertical portion in use; and
 - means for the ejection of said subprojectiles out of said dispenser, sideways or downwards.
2. A dispenser according to claim 1, wherein said stowage means comprise partitions attached transversally to said vertical portion of said T-structure and, at their longitudinal ends, to said envelope, said subprojectiles being disposed between said partitions and between said envelope and said partitions.
3. A dispenser according to claim 2, wherein said partitions are substantially normal to said vertical portion of said T-structure.
4. A dispenser according to claim 2, wherein said partitions are oblique with respect to said vertical portion of said T-structure.
5. A dispenser according to claim 1, wherein said stowage means includes compartments, said subprojectiles being disposed in these compartments so that, on their ejection, their trajectory forms a small or zero angle with said vertical portion of said T-structure.